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May 13, 2013

Sabrina Forrest
Site Assessment Manager
U.S. Environmental Protection Agency
1595 Wynkoop Street, 8EPR-B
Denver, CO 80202-1129

Subject: Letter Report: London Mine (EPA ID# CO0000286203), Park County, Colorado

Dear Sabrina,

The London Mine has been the subject of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Site Assessment activities and is currently under Notice of Violations / Cease and Desist Orders with the Colorado Department of Public Health and Environment (CDPHE) – Water Quality Control Division (WQCD) regarding two Colorado Discharge Permits associated with the site. Currently, its status on Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) is No Further Remedial Action Planned (NFRAP) (as of December 17, 2010). This letter report summarizes the history of this site and recommends to the U.S. Environmental Protection Agency (U.S. EPA) that no further assessment is needed at this time.

Site Background

The London Mine Site (LMS) is located in the headwaters of South Mosquito Creek, approximately 4 miles west of the Town of Alma in Park County, Colorado, at an elevation ranging from 11,000 feet above mean sea level (msl) to 12,400 feet above msl. Mining and milling operations have been intermittently active at the LMS since 1875. The LMS is divided into three segments: 1) the South Mosquito Creek (SMC), 2) Upper Mosquito Creek (UMC), and 3) Lower Mosquito Creek (LMC) areas.

1) The South Mosquito Creek area encompasses a 2 ½-mile long by ¾-mile wide (1.9 square miles) valley between the London and Pennsylvania mountains. The LMS (London Butte [Water Tunnel] and London Extension Tunnel mines) are in this valley. The SMC drainage, which includes the No Name Creek tributary, runs northeasterly in the alpine valley towards the Mosquito Gulch to join Mosquito Creek (MC). The SMC is listed as an impaired water body under section 303(d) of the Clean Water Act. (6 sources listed - including London Mine Butte discharge, London Extension Mine Water Discharge (Tunnel?), London Ext. Mine Dump, London Mine Historic Mill Tailings (was 319 project successful? If so, please add data), Butte Tunnel Mine Rock Dump

2) The UMC area covers the 3 ½-mile long by ¾-mile wide (2.6 square miles) valley from the headwaters of MC down to the SMC/MC confluence junction between the London and Loveland mountains. (5 sources including Champaign, N. London Mine Dump, N London Mine Mill Tailings)

3) The LMC area is a 4-mile long by 1-mile wide (4 square miles) valley along the Mosquito Gulch starting from the SMC/MC confluence junction and continuing eastward to the Middle Fork South Platte River. (4 sources listed – Montgomery-Alma/Betts Mill Tailings (was 319 work successful, if so, add supporting data), Orphan Boy Mine Rock Dump, unnamed dumps, Hock Hocking Mine Rock dumps)

The most recent mining activities at the LMS were in 1981-91. In 1980, a Mined Land Reclamation Permit M-1980-250 was issued for modern mining and milling operations at the LMS. In 1997, at the request of the London Mine Limited Liability Company (LLC), the Colorado Mined Land Reclamation Board revoked the permit and forfeited the $12,000 reclamation bond. The title to the surface and mineral rights of the mining claims at the LMS was held by Mr. Ben L. Wright. The LMS is now operated by the Estate of Ben Wright (former London Mine Manager) on behalf of London Mine, LLC (the "Estate").

The London Butte Mine Water Tunnel operates under a Colorado Discharge Permit System (CDPS) Permit Number CO-0038334 through the CDPHE-WQCD. The facility consists of a treatment works for an underground mining operation that is no longer in operation. Contributing wastewater sources at the facility include mine water and groundwater conveyed through the London Butte Mine Water Tunnel. The facility treats mine related wastewater from the tunnel portal through a sedimentation pond. The permit authorizes London Mine, LLC to discharge treated wastewater from the facility through the outfall associated with the final sedimentation pond (Outfall 001A) and into South Mosquito Creek. The final sedimentation pond receives water directly from the tunnel portal. Since 2006, the Water Tunnel discharge has consistently exceeded certain effluent limitations outlined in the Permit (i.e., metals (Cadmium and Zinc), pH, total suspended solids). As a result of the exceedances, the Division issued a Notice of Violation/Cease and Desist Order, Number IO-090715-1 to London Mine, LLC on July 15, 2009, with the expectation that London Mine, LLC engage in efforts to ensure compliance with the Permit by no later than March 31, 2010. As of today, the facility is still not in compliance with the Permit. Additionally, the CDPHE-WQCD sent another Notice of Violation/Cease and Desist Order, Number IO-130321-1 to London Mine, LLC on March 21, 2013.

The London Mine Extension Tunnel operates under a CDPS Permit Number CO-0045209 through the CDPHE-WQCD. The mine waste treatment process consists of a collection system inside the mine adit, followed by cement kiln dust addition equipment, and a lined settling pond. Overflow from the settling pond discharges (Outfall 001) to No Name Creek, while the cement kiln dust and metals settle out in the pond. The CDPHE-WQCD issued a Compliance Order on Consent, Number IC-12051401 on May 18, 2012 to London Mine, LLC regarding Prairie Center Metropolitan District No. 9. The Estate replied to this Compliance Order on Consent as follows:

> "The London Mine, LLC and THF Prairie Center Development, LLC (THF/Prairie) are parties to a Stipulation entered into before the Colorado Water Quality Control Commission in 2004. The Stipulation addresses the operation and maintenance of the Extension Tunnel Treatment Plant (the "Facility"). The Stipulation provides that "THF shall provide for continued operation and maintenance of the Extension Tunnel Treatment Plant to treat water discharged from the London Mine via the Extension Tunnel." Moreover, under Prairie's Permit No. CO-0045209,

THF/Prairie's duty extends to the "collection system inside the mine adit," i.e., the Extension Tunnel. It is THF that has the obligation and duty to maintain and operate the Extension Tunnel and the Facility. For more than a year, exceedances under the London Permit have been measured. These exceedances have been troubling to the Estate for many reasons, not least of which is the fact that the water known to be discharged under the London Permit through the Water Tunnel was clean, not requiring treatment under the Stipulation before it is discharged. The Stipulation only required treatment of the water discharged from the Extension Tunnel under the Prairie permit. The London Mine, LLC has been actively looking into what the potential cause of these effluent limitation exceedances may be, including exploring technical resources for assessing the situation. From investigations conducted to date, which include guidance received from technical consultants, the London Mine, LLC understands that the water that should be discharged from the Extension Tunnel to the Facility for treatment is unfortunately being diverted to the London Mine Water Tunnel. The Estate and the London Mine, LLC have been advised that the diversion of the Extension Tunnel water to the Mine Water Tunnel is a result of damage to the Extension Tunnel caused in connection with THF's past operations at the London Mine. Because the Extension Tunnel water is not discharging to the Facility and therefore has not been treated, when it comingles with the Mine Water Tunnel water it results in the Water Tunnel effluent limitations exceedances. We believe this unauthorized discharge and/or unauthorized bypass of the Extension tunnel water into the Mine Water Tunnel is a violation of the Prairie Center Metropolitan District No. 1 Permit."

According to Ms. Kelly Morgan of the CDPHE-WQCD, there has been no effluent discharging from the Extension Tunnel in over a year, and instead, the water that should be discharging from this point is being discharged from the Mine Water Tunnel. Ms. Morgan stated that the Estate and London Mine, LLC are still in discussions with THF/Prairie regarding the Extension Tunnel damages resulting in water quality exceedances from the Water Tunnel effluent.

Previous CERCLA Investigations

In 1995, the CDPHE conducted a Preliminary Assessment (PA), with a subsequent Site Inspection (SI) conducted in 1996. Surface water analytical results by stream segment are as follows:

- Upper Mosquito Creek: Magnesium, potassium and zinc exhibited elevated metals concentrations downstream from the main stream Upper Mosquito Creek wetland and fishery areas. Sediment samples did show widespread elevated analyte concentrations.
- South Mosquito Creek: Metals concentrations were generally higher than those found in Upper Mosquito Creek. The most downstream aqueous sample taken from the main South Mosquito Creek showed the highest metals concentration for copper (6.70 µg/L), lead (45.20 µg/L), and manganese (40.00 µg/L). High dissolved and total metals concentrations were found in the London Extension Mine drainage sample for barium, cadmium, calcium, copper, iron, magnesium, manganese, nickel, sodium, and zinc. Total zinc concentrations in aqueous samples ranged from 20.10 µg/L to 332 µg/L, with the highest total zinc concentration of 562 µg/L detected in a sample collected downstream of the mine on No Name Creek tributary. In addition, the total cadmium concentration in this sample was 1.80 µg/L. Sediment samples generally exhibited lower analyte concentrations than in the Upper Mosquito creek except for cadmium and zinc. The Ambient Water Quality Criteria (AWQC) for surface water as listed in the Superfund Chemical Data Matrix (SCDM, 1994) for Cadmium = 1.1 µg/L, Lead = 3.2 µg/L, and Zinc = 110 µg/L.

- Lower Mosquito Creek: Though at lower concentrations, the same analytes found with elevated concentrations in the South Mosquito Creek were reflected in the main stream of the Lower Mosquito Creek. Zinc concentrations ranged from 117 to 119 µg/L.
- Middle Fork South Platte River: None of the release aqueous samples from the Middle Fork South Platte River exhibited high dissolved metal concentrations except for copper, which was elevated in the Middle Fork South Platte River wetland and fishery below the Sacramento Creek. Although below AWQC standards, zinc total metals concentrations were also elevated starting in the wetlands below the Pennsylvania Creek and down below the Sacramento Creek. For total metals in the sediment samples, elevated concentrations were indicated for arsenic, silver, and sodium.

Based on CDPHE's SI, EPA determined in 1998 that the area was a high priority for further assessment based on:

- Source Areas totaling 23 acres of tailings, 250000 cubic yards of mine related sources and draining adits;
- Releases of multiple metals to wetlands and a fishery above SCDM benchmarks;
- A segment of fishery gone due to contamination;
- The potential presence of threatened and endangered species; and
- Elevated concentrations of several metals that were found in ground water used for drinking water, when compared to available background.

In 2010, EPA determined that no further remedial action was warranted at the site due to "significant water treatment work being performed by other parties, including the owners and State of Colorado Division of Reclamation Mining and Safety." Thus, the site was given a no further remedial action planned (NFRAP) determination and was archived from the CERCLIS database. Archived sites may be returned to the CERCLIS site inventory if new information necessitating further Superfund consideration is discovered.

Refer to Attachment 1 summarizing all records/file review conducted as part of this Letter Report from the CDPHE – Hazardous Materials and Waste Management Division, the CDPHE-WQCD, and the Colorado Division of Reclamation, Mining and Safety (DRMS).

Current Activities/Data

DRMS is currently in the process of conducting tailings reclamation at the LMS due to South Mosquito Creek failing to meet applicable standards for zinc, iron, manganese, and cadmium. Based on a project summary provided by the DRMS, the LMS contains three mill tailings piles and a number of waste rock piles that are immediately adjacent to South Mosquito Creek. In the spring, the creek significantly erodes the tailings piles which leach acidic, metal-laden water and sediment into the creek. When the mining permit was revoked in 1997, at the request of London Mine, LLC, they forfeited the $12,000 reclamation bond which was used by DRMS to partially stabilize portions of the tailings, but were significantly insufficient to complete reclamation of the overall site to applicable performance standards. DRMS plans to implement the tailings reclamation project as follows:

> "The London tailings reclamation can most efficiently be completed over two construction seasons, in 2013 and 2014. Site investigations indicate that tailings fill the natural bed of South Mosquito Creek, and that the creek has been relocated to route along the north edge of the tailings. The preferred reclamation alternative for the London tailings 2013 project area includes removal of tailings adjacent to the relocated creek down to creek level and consolidation into the

impoundment constructed in the 1980s (known as the "Elephant Trap"). The consolidated tailings will then be banked against the north flank of Pennsylvania Mountain to maximize separation of the tailings from the relocated creek. Structural fill imported to the project area from permitted gravel sources at or near Alma or Fairplay will be placed over tailings as capping material and to maintain the relocated creek in its current configuration, and plant growth medium will be applied over the cap. A mix of wetland, riparian, and upland vegetation zones will be established in the excavated area and over the consolidated and capped tailings."

Refer to Attachment 2 for DRMS's project summary packet.

The self-monitoring effluent data collected by London Mine, LLC from May 2009 to January 2013, regarding CDPS Permit Number CO-0038334 (Water Tunnel), exceed the effluent limitations imposed by Part I.A.1 of the Permit as follows:

- Total Suspended Solids: Max 7 Day Average Limit = 20 mg/L (***Result = <50***)
  30 Day Average Limit = 20 mg/L (***Result = <50***)
- pH: Minimum Limit = 6.5 S.U. (***Result = 6.23 and 6.4***)
- Zinc (potentially dissolved): Max 7 Day Average Limit = 1,300 µg/L
  (***Result = 1,400 to 4,910***)
  85th Percentile of 24 Month Rolling Average Limit = 654 µg/L
  (***Result = 1,377.5 to 2,967***)
- Cadmium (potentially dissolved): 30 Day Average Limit = 3.2 µg/L (***Result = 3.8 to 14.9***)

Ms. Morgan of the CDPHE-WQCD provided the following recent surface water monitoring data from South Mosquito Creek, which was conducted by Golder Associates, Inc.:

Date Sampled	Analyte (Dissolved Metal)	Result (µg/L)	State Table Value Standard (µg/L)
10/18/2012	Cadmium	***3.0***	0.74
	Zinc	***820***	280
11/14/2012	Cadmium	***2.3***	0.72
	Zinc	***600***	280
12/14/2012	Cadmium	***3.1***	0.74
	Zinc	***730***	280
01/09/2013	Cadmium	***2.5***	0.77
	Zinc	***870***	280
02/12/2013	Cadmium	***2.3***	0.77
	Zinc	***740***	280

Conclusion and Recommendation

The LMS, owned by London Mine, LLC, was the subject of a Preliminary Assessment (1995) and Site Inspection (1996). Two CDPS Permits are associated with the LMS, including CDPS Permit Number CO-0038334 (London Mine Water Tunnel) and the CDPE Permit Number CO-0045209 (London Mine Extension Tunnel). A wastewater treatment facility has historically treated mine-related water discharging from the Extension Tunnel prior to discharging to No Name Creek and subsequently South Mosquito Creek, while water discharging from the Water Tunnel has historically been considered "clean". Since 2009 to the present, and due to damage in the Extension Tunnel from what London

Mine, LLC claims happened from THF/Prairie's actions, water that would otherwise discharge from the Extension Tunnel has re-routed itself through the Water Tunnel discharge resulting in effluent exceedances in the Water Tunnel CDPS Permit. For approximately the last year, effluent discharge has not occurred through the Extension Tunnel. The CDPHE-WQCD has issued a Compliance Order on Consent to London Mine, LLC on June 18, 2012 regarding the CDPS Permit noncompliance with the Extension Tunnel. In addition, the CDPHE-WQCD issued a Notice of Violation/Cease and Desist Order to London Mine, LLC on March 21, 2013 regarding the CDPS Permit noncompliance with the Water Tunnel.

DRMS is currently in the process of planning tailings reclamation activities at the LMS in the summer of 2013 and 2014. Planned site activities include removal of tailings adjacent to South Mosquito Creek down to creek level and consolidate the tailings into the impoundment previously constructed in the 1980s (known as the "Elephant Trap"), which is banked against the north flank of Pennsylvania Mountain and will maximize separation of the tailings from the creek.

Based on recent surface water data collected from South Mosquito Creek by Golder Associates, Inc. at the end of 2012 and beginning of 2013, concentrations of zinc and cadmium, while above State Table Value Standards for this stream segment, were similar to slightly higher than samples collected during the previous SI investigation. However, during the previous SI, none of the surface water samples collected from the Middle Fork South Platte River (further downstream and considered a fishery) exhibited high dissolved metal concentrations attributable to the LMS, which is still most likely the case based on current data.

Based on the planned upcoming tailings reclamation activities by DRMS and the current CDPHE-WQCD enforcement action activities with regard to the CDPS Permits associated with the Extension Tunnel and the Water Tunnel, the CDPHE recommends that the CERCLIS designation of "No Further Remedial Action Planned" is applicable for the LMS based on Other Cleanup Activity (OCA) occurring and that the site should be maintain as archived. However, the CDPHE recommends conducting a file review on this site in the future to confirm that current OCA efforts are successful and if further Superfund consideration is warranted.

Please contact me at 303-692-3324 or alissa.schultz@state.co.us if you have any questions.

Sincerely,

Alissa Schultz
Environmental Protection Specialist
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment

Attachments
1: Figures
2: Summary of Records/File Review
3: DRMS Project Summary

References

CDPHE (HWWMD), July 22, 1995, *Preliminary Assessment – London Mines/Mosquito Creek Basin – Park County, Colorado*.

CDPHE (HMWMD), April 24, 1998, *Site Inspection – Analytical Results Report – London Mines/Mosquito Creek Basin (CERCLIS ID CO0000286203*).

CDPHE (WQCD), various documents, correspondence, and data regarding CDPS Permits, and personnel communication with Ms. Kelly Morgan of the WQCD (see Attachment 1)

DRMS, London Mill Tailings Reclamation Project Summary Packet and personnel communication with Ms. Erica Crosby of DRMS (see Attachment 2).

ATTACHMENT 1

FIGURES

ATTACHMENT 2

SUMMARY OF RECORDS/FILE REVIEW

ATTACHMENT 3

DRMS PROJECT SUMMARY